9/Appeal Brief
J. Steptoe
1/15/02

UTILITY PATENT APPLICATION
SN 09/375,695

Docket No. GE-06987A

CERTIFICATE OF MAILING (37 CFR 1.8)

I hereby certify that I will cause this correspondence to be deposited with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, DC 20231 on or before November 3, 2001.

William H. Meise — *November 3, 2001*
Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

SERIAL NUMBER	:	09/375,695
FILING DATE	:	August 17, 1999
INVENTOR	:	Hoyle et al.
FOR	:	CONSTANT-TEMPERATURE-DIFFERENCE FLOW SENSOR,AND INTEGRATED FLOW, TEMPERATURE, AND PRESSURE SENSOR
EXAMINER	:	Jewel V. Thompson
ART UNIT	:	2855

BRIEF ON APPEAL

1. REAL PARTY IN INTEREST

The application is assigned to Lockheed Martin Corporation. The assignment is recorded at reel 010183, frame 0871.

2.RELATED APPEALS AND INTERFERENCES

[NONE]

3. STATUS OF CLAIMS

Claims 1-12 were originally filed, with claims 1 and 12 being independent. The claims have not been amended. Claims 1-12 are rejected. Appeal is taken from the rejection of claims 1-12.

4. STATUS OF AMENDMENTS

No amendment after final rejection has been filed.

5. SUMMARY OF THE INVENTION

The invention relates to an integrated fluid flow, temperature, and pressure sensor adapted for use in a complex fluid control system having network connections. The sensor (illustrated as 800 of FIGURE 9) includes a body defining or including a path for the flow of fluid therethrough. In FIGURE 9, the path includes two threaded pipe fittings 916 and 918, and a fluid path 12. Fluid path 12 is described in relation to FIGURES 1a and 1b at page 9, lines 5-8. The integrated sensor also includes a fluid flow rate sensor, a fluid temperature sensor, and a fluid pressure sensor, for performing the kinds of system evaluations and control, described in conjunction with FIGURE 10, at page 26, line 14 to page 27, line 22. As described at page 27, line 23 to page 28, line 21, a useful arrangement of the integrated flow, temperature and pressure sensors according to an aspect of the invention is to place one such sensor on each side of a remotely controllable fluid control valve, to thereby allow verification of the operation of each valve, and to detect breaks or leaks in the pipes.

The reliability of the fluid flow sensor portion of the integrated flow, temperature and pressure sensor is enhanced by avoiding the use of propeller-type, and certain other types, of flow sensors, as mentioned at page 2, line 21 to page 3, line 26. Instead, the flow sensor portion of the integrated sensor uses (a) an upstream fluid temperature sensor (26 of FIGURES 1a, 1b, 2, 3, 4, 5, 6, and 8), described at page 9, lines 18-25, and elsewhere, for determining the upstream temperature of the fluid (page 9, lines 19-21), (b) a heater (18 of FIGURES 1a, 1b, 2, 3, 4, 5, 6, and 8), which is described at page 9, lines 10-12, one possible embodiment of which is identified at page 12, lines 8-10 as being an electrical resistance heater, and (c) a controller or control arrangement (20 of FIGURE 1a or 220 of FIGURE 2, or the structures of other FIGURES) for applying sufficient power to the

heater to raise the temperature of the *heater* above the upstream fluid temperature by a fixed or given amount, as described at page 10, lines 15-24, at page 12, lines 3-8, and at page 32, lines 9-17. Since the control arrangement depends upon knowing the temperature of the heater (18), some sort of heater temperature sensor must be available; this can be an actual separate temperature sensor (24 of FIGURE 1) thermally coupled to the heater (18) as described at page 10, lines 20-22 and page 12, lines 17-19, or it can be of some other type, such as an electrical heater resistance measurement (page 20, lines 23-31; page 33, lines 17-25).

The pressure sensor (810 of FIGURE 8) of the integrated flow, temperature, and pressure sensor is mounted within the body of the integrated flow, temperature and pressure sensor, as stated at page 32, lines 19-24, and as illustrated in FIGURE 9. In one embodiment, the pressure sensor is of the ratiometric type (page 22, lines 7-15 and page 34, lines 26-30. The pressure sensor generates an electrical signal representing the sensed pressure (page 22, lines 10-18, page 32, lines 19-25).

The temperature measurements associated with the integrated flow, temperature, and pressure sensor are made with the aid of the temperature sensor(s) used in conjunction with the flow sensor, so no separate equipment is necessary to perform the temperature measurements.

The integrated flow, temperature and pressure sensor includes a signal processor (812) coupled to the controller, the temperature sensor, and the pressure sensor, as described at page 32, lines 25-31, for performing the processing to generate digital signals representative of the flow, the temperature, and the pressure (page 33, lines 1-3). A standardized connector (940 of FIGURE 9) is coupled to the body (910) for providing a convenient connection for the network (340), as described at page 24, lines 10-16, and at page 33, lines 5-11.

6. ISSUES

a. Claims 1-4, 6, 7 and 12 are not anticipated in a 35 U.S.C. § 102(b) sense by the Alvesteffer et al. reference.

b. Claims 5 and 8-11 are not unpatentable in a 35 U.S.C. § 103(a) sense over Alvesteffer et al. in view of Redford et al. and Azima.

7. GROUPING OF CLAIMS

Independent claims 1, dependent claims 2-4, 6, and 7, and independent claim 12, stand and fall together. Dependent claims 5 stands or falls independently of other claims, because it recites matter, namely the storage of information relating to the cross-sectional area of the fluid path, not found in the other claims. Dependent claim 8 stands and falls independently of the other claims, because it recites matter, namely the integration of the temperature controller and the processor, not found in the other claims. Dependent claims 9 and 10 stand or fall together, independent of the other claims, because they include matter, namely the ratiometric nature of the pressure sensor, which is not found in the other claims. Claim 11 stands or falls independently of the other claims, because it recites matter, namely the integration of a valve, which is not found in the other claims.

8. ARGUMENT

8A. The §102 rejection of claims 1-4, 6, 7, and 12 is not in point, because the recitations of the claims completely distinguish over Alvesteffer et al. More particularly, claim 1 recites inter alia

"pressure sensing means located within said body, for sensing fluid pressure in said path at a location adjacent to one of said heating means and said temperature determining means, for generating an electrical signal representative of the pressure of said fluid;"

for which Alvesteffer et al. have no corresponding element. In fact, Examiner's analysis of the Alvesteffer et al. reference is incorrect in respect to the presence of a this element of the claimed invention, namely the "pressure sensing means (54)" adverted to at page 3 of the Final Rejection of August 27, 2001. As stated, Alvesteffer et al. have no pressure sensor whatever, as may be confirmed by reference thereto. Item 54, which Examiner identifies as a pressure sensor, is in fact a power controller (see FIGURE 3; column 7, lines 21, 32, 59; column 8, lines 1 and 25). The word "pressure" does in fact occur in the specification of Alvesteffer et al. at column 4, line 11 and at column 7, line 13, but in contexts which make it clear that no pressure sensing takes place.

Independent claim 12 of the application includes a recitation corresponding to that set forth above in relation to claim 1, so claims 1 and 12 are patentable over Alvesteffer et al. in a §102 sense.

In addition, claim 1 recites inter alia

"signal processing means located within said body, and coupled to said control means, to said temperature determining means, and to said pressure sensing means, for processing said flow signal, said temperature signal, and said pressure signal, for generating digital signals representing said flow, said temperature, and said pressure, for transmission over a digital signal transmission path;"

which is clearly not the case for Alvesteffer et al., which

contains no pressure sensor whatever. Thus, claim 1 distinguishes in yet another way over Alvesteffer et al. Claim 12 includes a recitation corresponding to that of claim 1, and also distinguishes over Alvesteffer et al.

Dependent claims 2, 3, 4, 6, and 7 are patentable as being dependent on patentable parent claim 1.

Consequently, claims 1-4, 6, 7, and 12 are patentable in a 35 U.S.C. §102 sense over the Alvesteffer et al. reference, and the rejection thereof must fail.

8B1. Claims 5 and 8-11 are rejected under 35 U.S.C. §103(a) as unpatentable over Alvesteffer et al. in view of Redford et al. and Azima. This basis for rejection is traversed because there is no proper nexus for Examiner's suggested combination of references, because the suggested combination cannot be made, and because Examiner's suggested combination, even if made in the absence of a proper nexus therefor, does not in such combination make the claimed invention.

In addition, Examiner's approach to the determination of patentability for purposes of §103 is flawed. In particular, the identification of those elements of the claim which are missing from the principal reference, and the identification of the missing elements in ancillary references, is redolent of "hindsight" reconstruction and the assemblage of bits and pieces of the claimed invention from the prior art based on Applicant's own disclosure, both of which have been found wanting by the courts.

8B2. There is no proper nexus for Examiner's suggested combination of the Alvesteffer et al., Redford et al., and Azima references. In order to show a proper nexus, there must be some *suggestion* found within the references themselves, or set forth by Examiner by the application of science and logic, which makes

it clear that a person skilled in the art would consider combining the teachings thereof. However, it is well established that references cannot be combined simply because they relate to the same art. It is also well established that references cannot be combined simply because it is *possible* to do so.

In the present instance, Examiner recites in the second paragraph at page 5 of the Final Rejection, without so much as a recitation of elements, that "Alvesteffer et al teaches the aspects of the claimed invention **except** . . ." and goes on to list several items which Examiner feels are not shown. A conclusion of obviousness in relation to the preprogrammed memory follows this recitation (bottom of second paragraph of page 5 of the Final Rejection). To this point, there is not even mention of the secondary references, and no nexus has been established.

In the third paragraph of page 5 of the Final Rejection, Examiner states that "it appears that the control means and the signal processor are integrated into a single unit . . .. It would have been obvious . . . integrated [sic] the processor and the control means as to provide the most effective and accurate output." Again, it is noted that the argument and conclusion herein are made without reference to the secondary references, and therefore this statement cannot make a nexus between or among the references. Instead, the statement refers only to the Alvesteffer et al. reference, which suggests that a §102 rejection is meant, rather than §103. However, a §102 rejection does not contemplate obviousness, but rather anticipation. Thus, there appears to be some confusion on Examiner's part as to the nature of the rejection. Nevertheless, it can be said that the third paragraph of page 5 of the Final Rejection does not establish a nexus between or among the references, and the obviousness nature of the argument/rejection is inappropriate to its stated basis.

In the paragraph at the top of page 6 of the Final

Rejection, Examiner states "Redford et al. teaches ratiometric control signals. It would have been obvious . . . to have placed a ratiometric sensor of Redford et al. in the mass flow sensor of Alvesteffer et al. in order to provide a measurement of the ratio of pressure proportional to the measurement of heat and temperature." As stated above, references cannot be combined simply because they relate to the same art area. In the present situation, since Alvesteffer et al. do not contain a pressure sensor, there is not even a related art area, and the Redford et al. reference cannot be combined with Alvesteffer et al. reference for lack of a proper nexus therefor. Examiner attempts to provide a basis for the suggested combination of references by the comment "in order to provide a measurement of . . .pressure proportional to the measurement of heat and temperature." Since the pressure sensor of the invention as recited in claim 1 (and similarly in claim 12) is

". . . for generating an electrical signal representative of the pressure of said fluid;"

it is not obvious why a measurement of "pressure proportional to heat and temperature" would motivate a person skilled in the art to make the suggested combination of Alvesteffer et al. with Redford et al. Applicant believes that a proper nexus for Examiner's suggested combination of Alvesteffer et al. with Redford et al. is not established, and the suggested combination cannot be made for purposes of §103.

Lastly, Examiner sets forth the justification for the suggested combination of Azima with Alvesteffer et al. in the second paragraph of page 6 of the Final Rejection "Azima teaches a mass flow controller comprising a valve (20). It would have been obvious . . . to have placed the valve of Azima in the flow sensor of Alvesteffer et al in order to provide control of the flow flowing in the path." The argument is tautological, and provides no proper nexus.

Thus, there does not appear to be any proper nexus for Examiner's suggested combination of Alvesteffer et al. with Redford et al. or with Azima. In the absence of a proper nexus, the suggested combination cannot be made for purposes of a §103 rejection. If Examiner's suggested combination of references is not made, the §103 rejection of claims 5 and 8-11 fails.

8B3. The references cannot be combined for purposes of rejection of claims 9 and 10. In short, Examiner's statement (page 5, second paragraph) that Alvesteffer et al. contains all the elements of the claimed invention does not appear to be correct, at least as it applies to the claimed pressure sensor. Since there is no pressure sensor in the Alvesteffer et al. reference, there is nothing into which the ratiometric pressure sensor of Redford et al. can be melded. Thus, the suggested combination of Alvesteffer et al. with Redford et al. cannot be made at all, and the rejection of claims 9 and 10 fails for this reason alone.

8B4. Even if the references are combined, notwithstanding the lack of a proper nexus for Examiner's suggested combination of references, the claimed invention is not made out.

More particularly, claim 5 recites

> "An integrated sensor according to claim 1, wherein said control means comprises a memory preprogrammed with a value corresponding to the cross-sectional area of said path, and said flow determination is in the form of one of mass quantity per unit time and volume per unit time"

Examiner concedes in the second paragraph of page 5 of the Final Rejection that Alvesteffer et al. does not "specifically" teach "a preprogrammed memory with a value corresponding to the cross-

sectional area of the [flow] path". A conclusion is then drawn (bottom of second paragraph of page 5 of the Final Rejection) that "It would have been obvious . . . to have programmed the memory to provide the cross-sectional area of the path in order to determine the mass flow rate in any structural body." The conclusion of obviousness, as set forth by Examiner, does not refer to any other reference, and contains no additional logical or scientific argument by Examiner. Examiner's conclusion of obviousness as to the preprogrammed memory is therefore *totally unsupported*. Being without support or foundation, the conclusion must be disregarded.

Put another way, none of the references appear to suggest that a preprogrammed memory should contain the value set forth, and the combination of references cannot be more extensive in a given regard than the most extensive of the individual references. Since no reference makes such a suggestion, and Examiner has not made up the deficiency, claim 5 must be deemed to be independently patentable, as well as patentable as depending from patentable claim 1.

Claim 11 recites inter alia

> "a control processor at a location remote from said body of said integrated sensor, and coupled thereto by way of said transmission path, for correlating valve state with fluid flow for one of (a) verifying operation of an element of said integrated sensor and (b) verifying the integrity of fluid paths to which said integrated sensor is connected."

which does not appear in any of the applied references. It should be noted that the claimed control processor acts on both the valves and the fluid sensors. None of the references contain such a control processor. Consequently, claim 11 is independently patentable over the applied art.

9. AUTHORITIES RELIED UPON

For the proposition that there must be identity of each and every element of the claimed invention and the reference in order to find anticipation, appellant relies upon one or more of RCA Corp. v Applied Digital Data Systems, Inc. 221 USPQ 385, 388 (Fed. Cir. 1984); Kalman v Kimberly-Clark Corp., 218 USPQ 781, 789 (Fed. Cir. 1983); Orthokinetics, Inc. v Safety Travel Chairs, Inc., 1 U.S.P.Q 2d 1081, 1087 (Fed. Cir. 1986); Hybritech, Inc. v Monoclonal Antibodies, Inc., 231 USPQ 81, 90 (Fed. Cir. 1986); Carella v Starlight Archery & Pro Line Co., 231 USPQ 644, 646 (Fed. Cir. 1986).

For the proposition that Examiner may not use hindsight and the applicant's own teaching to find a nexus, appellant relies on one or more of ACS Hospital Systems v Montefiori Hospital, 221 USPQ 929, 933 (Fed. Cir. 1984); In re McCarthy, 226 USPQ 99, 100 (Fed. Cir. 1985); Fromson v Advance Offst Plate, Inc., 225 USPQ 26, 31, 32 (Fed. Cir. 1985); In re Geiger, 2 UPSQ2d 1276 (Fed. Cir. 1987); andor Ex parte Gould, 6 USPQ2d 1680, 1684 (PTO Bd. of App. and Int. 1987), citing In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125 (Fed. Cir. 1984); Heidelberger Druckmaschinen AG v Hantscho Commercial Products Inc., 30 USPQ2d 1377, 1380 (Fed. Cir. 1994); Para-Ordnance Mfg. Inc. v. SGS Importers Int'l Inc., 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995)

For the proposition that the mere fact that two references relate to the same general subject matter is insufficient to make a proper nexus, appellant relies on one or more of ACS Hospital Systems v Montefiori Hospital, 221 USPQ 929, 933 (Fed. Cir. 1984); In Re Levin, 11 USPQ2d 1315, 1316 (Fed. Cir. 1989); In Re Clay, 23 USPQ2d 1058 (Fed. Cir. 1992); Oscar Meyer v ConAgra, 35 USPQ2d 1278, 1281 (Fed. Cir. 1994)

For the proposition that the Examiner must provide some rationale as to how and why references are to be combined for

purposes of showing obviousness, appellant relies on one or more of Ex Parte Kranz, 19 USPQ2d 1216, 1218 (PTO Bd. of App. and Int. 1991); In Re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992); Ex Parte Akamatsu, 22 USPQ2d 1915, 1923 (PTO Bd. of App. and Int. 1992), citing Ashland Oil v Delta Resins & Refractories, Inc., 227 USPQ 657 (Fed. Cir. 1985); Ex Parte Levengood, 28 USPQ2d 1300, 1301 (PTO Bd. of App. and Int. 1993); In Re Rijckaert, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993); In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988);

For the proposition that the mere fact that the prior art may be modified in a manner suggested by Examiner does not make the modification obvious unless the prior art suggests the desirability of the modification, and not merely its feasibility, appellant relies on one or more of Winner International v Wang, 53 USPQ2d 1580, 1587, (Fed. Cir. 2000); In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84, (Fed. Cir. 1992); In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir.1984);

For the proposition that Examiner may not pick and choose from the references only that which supports his position, appellant relies on In re Hedges, 228 USPQ 685, 687 (Fed. Cir. 1986), citing in re Wesslau, 353 F.2d at 241, 147 USPQ 391, 393 (CCPA 1965); In re Wright, 9 USPQ2d 1649 (Fed. Cir. 1989).

For the proposition that the references, when combined for purposes of § 103, must make the claimed invention, appellant relies on In re Mills, 16 USPQ2d 1430 (Fed. Cir. 1990)

For the proposition that a dependent claim is non-obvious if it depends from a non-obvious claim, appellants rely on In re Fine, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988), citing Hartness Int'l v Simplimatic Eng'g Co., 2 USPQ2d 1826, 1831; In re Abele, 214 USPQ 682, 689 (CCPA 19820

10. Conclusion

Examiner's rejection of claims 1-12 under 35 U.S.C. § 102(b) and 35 U.S.C. § 103 is without merit, and the rejection of the claims should be reversed.

11. Please charge the fee for the appeal brief to deposit account no. 7-0576.

Respectfully submitted,

BY: _____
William H. Meise
Registration No. 27,574

November 1, 2001
Patent Operation
Lockheed Martin Corporation
[10B50 - Bldg. B
P. O. Box 8555
Philadelphia, PA 19101
(610) 354-6426]
IN TRIPLICATE

APPENDIX

1. An integrated fluid flow, temperature and pressure sensor, said sensor comprising:

a body including a path for the flow of fluid:

temperature determining means located within said body, and coupled to said path, for making a determination of the upstream temperature of a fluid flowing in said path:

heating means located within said body, and coupled to said path, for transferring heat from said heating means to said fluid;

control means located within said body, and coupled to said heating means and to said temperature determining means, for applying power to said heating means in an amount required to raise the temperature of said heating means above said upstream temperature by a predetermined amount, and for converting the value of said power into a flow signal representing a corresponding flow;

pressure sensing means located within said body, for sensing fluid pressure in said path at a location adjacent to one of said heating means and said temperature determining means, for generating an electrical signal representative of the pressure of said fluid;

signal processing means located within said body, and coupled to said control means, to said temperature determining means, and to said pressure sensing means, for processing said flow signal, said temperature signal, and said pressure signal, for generating digital signals representing said flow, said temperature, and said pressure, for transmission over a digital signal transmission path; and

signal connection means mounted on said body, and connected to at least said signal processing means, for providing a standard connection between said signal processing means and said signal transmission path.

2. A sensor according to claim 1, wherein said pressure sensing means located within said body, generates an analog electrical signal representative of the pressure of said fluid.

3. An integrated sensor according to claim 1, wherein said control means comprises a second temperature determining means coupled to said heating means, for determining the temperature of said heating means.

4. An integrated sensor according to claim 3, wherein said second temperature determining means is an electrical resistor, and said second temperature determining means comprises means coupled to said heating means for measuring the electrical resistance of said heating means, and said control means

comprises means for converting the value of said resistance into a corresponding temperature.

5. An integrated sensor according to claim 1, wherein said control means comprises a memory preprogrammed with a value corresponding to the cross-sectional area of said path, and said flow determination is in the form of one of mass quantity per unit time and volume per unit time.

6. An integrated sensor according to claim 1, wherein said path is associated with a peripheral wall, and wherein said heating means is in the form of a peripheral structure surrounding said peripheral wall, and in thermal contact therewith.

7. An integrated sensor according to claim 6, wherein said peripheral wall is made from conventional materials having a thickness commensurate with the pressure and temperature of said fluid, except in a region near that in which said heating means is thermally coupled, in which region said peripheral wall is made from a material having higher strength than said conventional materials, of a thickness less than said commensurate thickness.

8. An integrated sensor according to claim 1, wherein said control means and said signal processing means are integrated into a single unit.

9. An integrated sensor according to claim 1, wherein said pressure sensing means is a ratiometric pressure sensor.

10. An integrated sensor according to claim 1, wherein said pressure sensor is a microelectromechanical system device.

11. An integrated sensor according to claim 1, further comprising

a controllable valve having a controllable flow channel connected by a further fluid path to said flow path of said integrated sensor, said controllable valve being within said body; and

a control processor at a location remote from said body of said integrated sensor, and coupled thereto by way of said transmission path, for correlating valve state with fluid flow for one of (a) verifying operation of an element of said integrated sensor and (b) verifying the integrity of fluid paths to which said integrated sensor is connected.

12. An integrated fluid flow, temperature and pressure sensor, said sensor comprising:

a body including a path for the flow of fluid in a region:

a temperature sensor located within said body, and coupled to said path, for making a determination of the upstream temperature of a fluid flowing in said path:

a heater located within said body, and thermally coupled to said path, for transferring heat from said heater to said fluid;

a controller located within said body, and coupled to said heater and to said temperature sensor, for applying power to said heater in an amount required to raise the temperature of said heater above said upstream temperature by a predetermined amount, and for converting the value of said power into a flow signal representing a corresponding flow;

a pressure sensor located within said body, for sensing fluid pressure in said path, for generating an electrical signal representative of the pressure of said fluid;

a signal processor located within said body, and coupled to said controller, to said temperature sensor, and to said pressure sensor, for processing (a) said flow signal, (b) said temperature signal, and (c) said signal representative of the pressure, for generating digital signals representing said flow, said temperature, and said pressure, for transmission over a digital signal transmission path; and

a signal connector mounted on said body, and connected to at least said signal processor, for providing a standard connection between said signal processor and said signal transmission path.